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EXAMINER

COUNTS, GARY W

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/762,779
Filing Date: July 03, 2001
Appellant(s): TERLINGEN ET AL.

Barbara E. Johnson
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 09/16/05 appealing from the Office action mailed 03/29/05.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

WO 90/05303	BERGSTROM et al.	05-1990
EP 0104608	DUNN et al	04-1984
US 5,942,397	TARLOV et al	08-1999
US 5,723,219	KOLLUR et al	03-1998
US 5,923,296	SLUKA et al	08-1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 44 and 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 44 is vague and indefinite because the claim is directed to a method for investigating the interaction of pre-determined chemical or biological species and does not set forth the steps involved in performing the analyzing. For example, there are no steps of contacting interactive species, binding of species or detection of the interaction. Further, the recitation "the interaction between chemical or biological species arranged on the device" is vague and indefinite because it is unclear if applicant is referring to the sulfur that has been deposited on the substrate or if applicant is referring to a sample containing a chemical or biological species which binds to the sulfur and is

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subsequently detected with another molecule or does the substrate comprise both a sulfur deposit and a chemical or biological species other than the sulfur or is applicant referring to something else? Please clarify.

Claim 45 is vague and indefinite because the preamble of the claim is directed toward a method. However, no method steps have been provided for performing the process. For example, there are no steps of contacting interactive species, binding of species or detection of the interaction. Further, the amended recitation "comprising the step of exposing or depositing chemical or biological species" is vague and indefinite because it is unclear what applicant is referring to. Is applicant referring to the sulfur that has been deposited on the substrate or is applicant referring to a sample containing a chemical or biological species which binds to the sulfur and is subsequently detected with another molecule or is applicant referring to something else? Please clarify.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 25, 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Bergstrom et al (WO 90/05303).

Bergstrom et al disclose a device comprised of a substrate (p 13, lines 13-21). Bergstrom et al disclose that a film of a free electron metal of gold is applied to the substrate (p. 5, lines 29-38). Bergstrom et al disclose that the gold surfaces are

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modified by sulfur compounds such as thiols (p. 6, lines 4-30) (same as disclosed by Appellant page 4 of the specification). Bergstrom et al disclose that the sulfur compounds have a high affinity for the metal (p. 4, lines 26-30) and that the sulfur binds to the gold metal film (p. 6). Bergstrom et al disclose that the sulfur compounds can be coupled to functional groups.

With respect to the deposited plasma and plasma deposited as recited in the instant claims. The claims are directed to a product and the patentability does not depend on its method of production (plasma deposited). Thus it is irrelevant how the device was produced. The teachings of Bergstrom et al disclose the same device as recited in the instant claims therefore, Bergstrom et al anticipates the instantly recited claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 25, 29-31, 33, 37-45, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al (EP 0104608) in view of Bergstrom et al (WO 90/05303).

Dunn et al disclose a method and apparatus for modifying the surface chemistry of a substrate. Dunn et al teach that the attachment and orientation of biologically active molecules can be controlled by varying the surface chemistry of a metal substrate surface by using plasma modification techniques which yield a range of surface chemistries and properties (page 4, lines 1-9). Dunn et al teach that these modified polymeric surfaces were subjected to solutions of biologically active molecules and subsequently tested to demonstrate that attachment and orientation of the large molecule is highly dependent on surface chemistry (page 4, lines 10-16). Dunn et al also teach that the surface of the substrate is irreversibly modified by grafting specific chemical functional groups onto the surface with a plasma of suitable material such as sulfur (page 5, lines 1-25). Dunn et al teach that plasmas can be generated by use of DC or AC sources having a frequency of about 1.0W to about 10 kw. Dunn et al also

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teach the use of radio frequency (r.f.) sources to generate plasmas (page 9, lines 14-30). Dunn et al disclose that r.f. plasmas are generated at a frequency of from about 1.0 to about 300 MHz at a power to initiate breakdown, such as from about 5 to about 1000 watts at pressures ranging from 0.001 to 10 Torr. The articles are subjected to the r.f. plasma for a period of about 0.1 seconds to about 120 minutes and the plasma treatment can be followed by a quench cycle at or near the surface with pressures ranging from 1 Torr to 760 Torr for time periods of 1 second to 4 hours (page 10, lines 6-19).

Dunn et al differ from the instant invention in failing to teach the substrate comprising a film of gold. Dunn et al also differ from the instant invention in failing to teach a bio/chemical functional layer is wet chemically arranged on the plasma deposited first functional group species layer.

Bergstrom et al disclose a substrate comprising a film of a free electron metal of gold. Bergstrom et al disclose that the gold surfaces are modified by sulfur compounds (p. 6, lines 4-30). Bergstrom et al disclose that the sulfur compounds have a high affinity for the metal (p. 4, lines 26-30) and that the sulfur binds to the gold metal film (p. 6). Bergstrom et al disclose that the sulfur compounds can be coupled to functional groups. Bergstrom et al disclose that gold is a preferred metal layer because of corrosion stability considerations (p. 5, lines 29-34). Bergstrom et al disclose applying a hydrogel to the first functional group and discloses that this hydrogel provides specificity for a second functional group species (p. 8-9). Bergstrom discloses that the hydrogel provides for the minimization of undesired interactions (p. 9).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of a gold film as taught by Bergstrom et al into the method and apparatus of Dunn et al because Bergstrom et al teaches that gold provides for a more stable metal surface because of corrosion stability considerations.

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a hydrogel as taught by Bergstrom et al into the method and device of Dunn et al because Bergstrom et al teaches that this hydrogel provides for the minimization of undesired interactions.

With respect to the conditions for gas plasma deposition recited in the instant claims, the optimum conditions for discharge power, exposure duration, plasma gas flow, pressure and frequency can be determined by routine experimentation and thus would have been obvious to one of ordinary skill in the art. Further, it has long been settled to be no more than routine experimentation for one of ordinary skill in the art to discover an optimum value of a result effective variable. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum of workable ranges by routine experimentation." Application of Aller, 220 F.2d 454,456, 105 USPQ 233, 235-236 (C.C.P.A. 1955). "No invention is involved in discovering optimum ranges of a process by routine experimentation." Id. At 458,105 USPQ at 236-237. The "discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art." Application of Boesch, 617 F.2d 272,276, 205 USPQ 215, 218-219 (C.C.P.A. 1980).

Claims 32 , 34, 46 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al and Bergstrom et al in view of Tarlov et al (US 5,942,397).

See above for the teachings of Dunn et al and Bergstrom et al.

Dunn et al and Bergstrom et al differ from the instant invention in failing to teach the substrate consists essentially of gold.

Tarlov et al disclose a substrate consisting essentially of gold which has bound to its surface sulfur compounds.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a substrate consisting essentially of gold as taught by Tarlov et al for the modified gold substrate of Dunn et al because Dunn et al and Bergstrom et al teach gold coated substrates having sulfur compounds bound on its surface and Tarlov teaches the substrate made of gold in which sulfur compounds are bound to the gold substrate. Therefore, one skilled in the art would have a reasonable expectation of success utilizing a substrate consisting essentially of gold.

Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al and Bergstrom et al in view of Kolluri et al (US 5,723,219).

See above for teachings of Dunn et al and Bergstrom et al.

Dunn et al and Bergstrom et al differ from the instant invention in failing to disclose that plasma is deposited from a monomer in gas form.

Kolluri et al teaches the use of a gas monomer in plasma polymerization techniques. Kolluri et al teach that the use of these monomers allow for the determination of a desired surface chemistry (col 5, lines 31-39).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the monomer as taught by Kolluri into the method of

Dunn et al as modified by Bergstrom et al because Kolluri et al shows that the use of these monomers allow for the determination of a desired surface chemistry.

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al and Bergstrom et al in view of Sluka et al (US 5,932,296).

See above for teachings of Dunn et al and Bergstrom et al.

Dunn et al and Bergstrom et al differ from the instant invention in failing to teach the cleaning of the substrate.

Sluka et al teach the step of cleaning the substrate by means of a pulsed argon plasma before the application of the functional groups to the substrate (col 3, lines 21-24). This process would allow for the removal of any possible surface contamination and allow the surface to be specifically furnished with specific binding sites which are capable of binding directly to an analyte or specific binding partner of interest (col 4, lines 13-15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the cleaning step as taught by Sluka et al into the method of Dunn et al as modified by Bergstrom et al because Sluka et al shows that this allows the surface to be specifically furnished with specific binding sites which are capable of binding directly to an analyte or specific binding partner of interest.

(10) Response to Argument

112 second paragraph rejections

Appellant argues that the techniques used for performing the "analyzing" of the interaction between chemical or biological species arranged on a device according to

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claim 25 are disclosed on page 1, lines 9-21 of the present application and can be seen as well known in the art. This is not found persuasive because as stated above and in the Final Office Action of 03/29/05 it is unclear if Appellant is referring to the sulfur that has been deposited on the substrate or if Appellant is referring to a sample containing a chemical or biological species which binds to the sulfur and is subsequently detected with another molecule or does the substrate have both a sulfur deposit and a chemical or biological species other than the sulfur or is Appellant referring to something else? Further, although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. Thus, claim 44 is vague and indefinite and cannot stand on its own merits.

Appellant further argues that claim 45 which depends from claim 44 that the terms "exposing" or depositing" are clear and therefore, the step of exposing or depositing chemical or biological species on the device of claim 25 is definite. This is not found persuasive because of (1) claim 45 does not depend from claim 44 as Appellant states but rather depends from claim 25 and (2) for reasons stated above and further the claim only requires exposing or depositing chemical or biological species on the device of claim 25 therefore it is unclear if Appellant is referring to the sulfur of claim 25 (which can be interpreted as a chemical species) or is Appellant referring to a sample containing a chemical or biological species which binds to the sulfur and is subsequently detected with another molecule or is Appellant referring to something else? Further, there is not step of detection (investigating) as recited in the preamble.

102 (b) rejections

Appellant argues the plasma phase consists of a wide variety of very reactive species, the final composition of a surface after treatment with a plasma is essentially disordered and unpredictable and does not have the same chemical composition as the gas that was originally used and therefore the stable sulphur plasma layer of the present invention is a completely different layer having substantially different properties from the self-assembled monolayer disclosed in the Bergstrom patent and thus Bergstrom does not teach each and every element particularly the stable sulphur plasma layer. This is not found persuasive because the deposited plasma and plasma deposited as recited are directed to a product and the patentability does not depend on its method of production (plasma deposited). The end result would be sulfur deposited on the gold film of the substrate and regardless how the sulfur is applied is irrelevant. Further, with respect to applicants statement that the deposited material has different properties than that of Bergstrom, this is not found persuasive because the claim recites comprising language directed to the gold film and therefore the gold film which binds to the sulfur can also have other components on it therefore, it reads on the instantly recited claims. The claims as recited do not exclude other elements. Therefore, the teachings of Bergstrom et al disclose the same device as recited in the instant claims therefore, Bergstrom et al anticipates the instantly recited claims.

103(a) rejections

Appellant argues that the Dunn patent does not include any of gold or silver or platinum and when considering the Dunn patent in its entirety, wherein all of the Examples use a polystyrene substrate and the list substrates fails to disclose any of the

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noble metals, the Dunn patent directs away from the use of gold as a substrate for plasma deposition. This is not found persuasive because when considering the Dunn et al patent in its entirety, Dunn et al specifically teaches the substrate can be metals such as aluminum or copper and Bergstrom et al specifically teaches that substrates can be copper, aluminum or gold and specifically teaches the advantages of using gold over copper and aluminum (two substances clearly taught by Dunn et al). Therefore, the combination of Dunn et al and Bergstrom et al is maintained for reasons stated above and further because Bergstrom et al specifically teaches the advantage of gold over copper and aluminum (two substances clearly taught by Dunn et al.). Therefore, one of ordinary skill in the art would have a reasonable expectation of success incorporating the use of gold film as taught by Bergstrom et al into the method and apparatus of Dunn et al.

Appellant argues the Bergstrom patent requires a particular orientation of the organic molecule X-R-Y to the metal surface and because of the nature of a plasma, the specific type of orientation required in the process of the Bergstrom patent could not be achieved using plasma, thereby destroying the intended function of the attachment process in the Bergstrom patent. This is not found persuasive because Examiner has not relied upon Bergstrom et al for the process, but rather has relied upon Bergstrom et al for teaching that it is known in the art to use gold as metal surface with sulfur deposited directly on the gold and for teaching the advantages of using a gold surface, and also for teaching the advantages of wet chemically deposited layers.

Appellant further argues that in the Affidavit, (Appendix B) by Dr. Gerardus Engbers. Dr. Engbers states that the specific orientation of the self-assembled monolayers (SAMs) could not be achieved by gas deposition. Because a plasma as disclosed in the Dunn patent is not suitable to yield a surface with a high degree of order and functionality such as required by the Bergstrom patent. This is not found persuasive because the argument is not on point. As stated above, the Examiner has not relied upon the Bergstrom patent (secondary reference) for the orientation of the molecule or the SAMs but rather has relied upon Bergstrom for the teaching that it is known in the art that sulfur is deposited directed onto the surface of a gold substrate.

In response to Appellants argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In the instant case, Dunn et al specifically teaches the substrate can be metals such as aluminum or copper and Bergstrom et al specifically teaches that substrates can be copper, aluminum or gold and specifically teaches the advantages of using gold over copper and aluminum (two substances clearly taught by Dunn et al). Bergstrom also specifically teaches that gold is a preferred metal layer because of corrosion stability considerations.

Appellant further argues that the claimed invention possesses unexpectedly improved surface properties that the prior art does not have. Appellant directs Examiners attention to Table 1, page 7 and Table 4, page 11 of the present specification. This is not found persuasive because as stated above the combination of Dunn and Bergstrom reads on the instantly recited claims and the fact that Appellant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App & Inter. 1985).

Appellant argues that the Examiner relies on the Tarlov patent for the asserted teaching of a substrate consisting of gold which has bound to its surface sulphur compounds. Because claims 32, 46 and 47 depend either directly or indirectly from claim 25, and claim 34 depends directly from claim 33, these claims are believed to be allowable over the teachings of the Dunn patent and the Bergstrom patent for reasons discussed. This is not found persuasive because as stated above the rejections of Dunn et al and Bergstrom et al are maintained and therefore, the combination with Tarlov et al is considered to be appropriate and reads on the instantly recited claims.

Appellant argues that the Examiner relies on the Kolluri patent for the asserted teaching of the use of a gas monomer and plasma polymerization techniques. Claim 35 depends indirectly from claim 33 and is thus allowable over the teachings of the Dunn patent and the Bergstrom patent for the reasons discussed. This is not found persuasive because as stated above the rejections of Dunn et al and Bergstrom et al

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are maintained and therefore, the combination with Kolluri is considered to be appropriate and reads on the instantly recited claims.

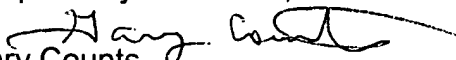
Appellant argues that the Examiner relies on the Sluka patent for the asserted teaching of the step of cleaning the substrate by means of a pulse argon plasma before the application of the functional groups to the substrate. Claim 36 depends directly from claim 33 and is thus allowable over the teaching of the Dunn patent and the Bergstrom patent for the reasons discussed. This is not found persuasive because as stated above the rejections of Dunn et al and Bergstrom et al are maintained and therefore, the combination with Sluka is considered to be appropriate and reads on the instantly recited claims.


(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,


Gary Counts
Examiner
Art Unit 1641
November 7, 2005


JEFFREY SIEW
SUPERVISORY PATENT EXAMINER
11/14/05

Conferees:

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